CLAIMS

1. Device for the *in-vivo* measurement of the concentration of an analyte in a body fluid comprising a) a component with a flexible surface, b) means for securing adherence of that surface to the skin, c) a rigid part holding one or more subcutaneously implantable sensors, d) means to position the flexible surface relative to the sensors in such a way that in a first position the sensors are concealed by the surface and in a second position the implantable parts of the sensors are exposed above the surface, and e) a mechanism to bring the surface from one to the other position

2. Device according to claim 1 wherein control and measuring means are integrated

3. Device according to claims 1 to 2, where the implantable part of a sensor is a full, rigid, thin pin-shaped module

4. Device according to claims 1 to 3, where the implantable part of a sensor has a diameter below 250 μm and an implantation depth of 1 to 5 mm.

5. Device according to claims 1 to 4, where the implantable part of a sensor is a pin coated with a sensing layer

6. Device according to claims 1 to 5, where the implantable part of a sensor includes a probe serving as a semi-permeable interface between the body fluid and the sensing layer

7. Device according to claims 1 to 6, where the implantable part of a sensor includes a light conducting element

8. Device according to claims 1 to 6, where the implantable part of a sensor is a ion-selective probe

9. Device according to claims 1 to 6, where the implantable part of a sensor is a sonnar probe

10. Device according to claims 1 to 6, where the implantable part of a sensor is a surface plasmon resonance probe

11. Device according to claims 1 to 10, where the implantable parts of the sensors consist of more than one functionally similar or different elements

12. Device according to claims 1 to 11, where the implantable part of the sensors has a structured surface in such a way that the exposed surface of the sensing layer is increased and protected from stripping during insertion into the skin

13. Device according to claims 1 to 12, where several sensors are used each being selective for a specific analyte

14. Device according to claims 1 to 13, where the means for securing adherence to the skin is an adhesive layer for temporary wearing on the body, and the adhesive layer is fixed on the flexible surface of the device by a reduced surface in comparison to the adhesive surface to the skin.

15. Device according to claims 1 to 14, where the means for bringing the flexible surface into two distinct positions relative to the implantable tip of the sensors makes use of the flexibility of this surface for a rapid movement from the first to the second position by relaxation from an enforced tense position

16. Device according to claims 1 to 15, where the means for bringing the flexible surface into two distinct positions is a mechanism actuated by pressing a knob or the cap of the device, respectively.

17. Device according to claims 1 to 16, where control and measuring means a) survey the correct functioning of the device, b) transform sensor signals into analyte measurements, c) store, display and transmit analyte measurements online or batch-wise, and d) give warning signals if analyte measurement is not within a predefined range

18. Device according to claims 1 to 17, where the device is composed of a reusable part comprising all control elements and a disposable part comprising at least the elements for adhesion to the skin and insertion into the skin

19. Device according to claims 1 to 18, where the reusable part can be combined with a variety of disposable parts with different sensors and there is an automatic recognition by means of a code on the disposable part

20. Device according to claims 1 to 19, where the disposable part is housed in a tool which allows, essentially through push-pull manipulations the assembly with the reusable part as well as all operations for making the device ready-to-use, and after use to disassemble the two parts

21. Method for measuring the concentration-time profiles of endogenous substances over a prolonged time period from hours to several days, by a) preparing the device according to claims 1 to 20 ready-to-use, b) attaching it to the prepared skin, c) activating the mechanism for inserting the implantable parts of the sensors into the skin and for starting the measuring process, d) measuring the concentration of the analytes by means of processing the sensor signals and e) using the measured concentrations for display and warning signals, and/or transmitting them online or batch-wise for further processing

22. Method for measuring the concentration-time profiles of exogenous substances including drugs and their metabolites or model compounds with well established metabolic pathways over a prolonged time period from hours to several days according to claim 21 by administering one or several substances to the individual by oral, intravenous, subcutaneous or other means as an acute, subchronic or chronic application

23. Use of the methods of claims 21 and 22 for the diagnosis of organ function

24. Use of the methods of claims 21 to 23 for the individualized adjustment of drug dosing and prediction of drug-drug interactions

25. Use of the methods of claims 21 to 24 by inclusion of personal diagnostic data of the patient and pharmacokinetic modeling algorithms

26. Use of the device according to claims 1 to 20 for automatic adjustment of the dosing of pharmacologically active compounds in connection with their controlled delivery by infusion pumps

27. Use of the device according to claims 1 to 20 for adjustment of diabetic patients to an optimized once or several times per day insulin injection and/or oral anti-diabetic drug treatment